



**DEPARTMENT OF THE AIR FORCE**  
HEADQUARTERS OKLAHOMA CITY AIR LOGISTICS CENTER (AFLC)  
TINKER AIR FORCE BASE, OKLAHOMA 73145

MEMORANDUM FOR HQ AFMC/ENPS

1 April 1996

4375 CHIDLAW ROAD, SUITE 6  
WRIGHT-PATTERSON AFB OH 45433-5006

FROM: OC-ALC/TILD  
3001 STAFF DR. STE 1AC83A  
TINKER AFB OK 73145-3041

SUBJECT: Air Force Advance Engineering Change Orders (AECOs) Against Contractor Drawings

1. Various OC-ALC engineers have expressed concern over the Air Force (AF) practice of issuing AECOs to contractor drawings when we do not possess the original masters. They also have voiced their concern over AF claims of drawing ownership and authority to unilaterally "change" contractor drawings when the contractor has custody and ownership of the original masters. The result is loss of configuration management. (See OC-ALC/LPART letter dated 28 Feb 96 and paper "Ownership of Drawings" dated 14 Oct 1986, attached.) The practice is covered by AFI 21-402.

2. The Air Force often needs to change drawings which document the configuration of items in its inventory. Unlike the Army which buys master, original drawings and can thus easily change the drawings for its items, the Air Force normally buys only copies of drawings with unlimited or limited rights to their use, and the contractor retains the master originals. To change a contractor drawing, the AF must negotiate with the contractor and acquire new copies of the contractor's drawings for placement in DOD data repositories.

3. The process of the AF changing AF drawings, or contractor master original drawings transferred to the AF through design activity transfers, is clear. However, there is controversy and lack of guidance concerning how to change drawings for which a responsible AF engineering office has mere copies, or no copies. For example, there are many misconceptions, as follow:

a. MISCONCEPTION: The copies of contractor drawings are "originals" owned by the government. FACT: The drawings are only copies which may or may not be proprietary or have "unlimited rights" to use, and the AECOs are a misrepresentation of the drawing.

b. MISCONCEPTION: The contractor is prohibited from making changes to the drawing without their particular engineering office's authorization. FACT: The contractor may change the drawings at any time under "Class 2" change authority. Also, other programs using the drawing may require changes; the drawing may have multiple applications under other programs or systems; or the drawing may be proprietary or commercial and the contractor's authority to change the drawing without government concurrence or knowledge is beyond question.

c. MISCONCEPTION: "Someone" takes the AECOs and has the contractor incorporate them into the drawings. FACT: That does not happen.

d. MISCONCEPTION: An AECO lasts “forever”. FACT: The next revision release supersedes and loses any change if not on the revised drawing.

e. MISCONCEPTION: The contractor must accept and incorporate the AECO. FACT: The contractor has no obligation whatever without a contractual agreement, and ignores the AECO.

f. MISCONCEPTION: The contractor is aware of AECOs made unilaterally by the government and includes them when contracted for modifications. FACT: The contractor has no contractual obligation to recognize the AECOs.

4. There are conflicting practices for AECOs at different ALCs. SA-ALC reviews and issues new AECOs against new revisions, if still needed, recognizing that the new revision supersedes the old revision and all of its outstanding ECOs. OC-ALC retains the superseded AECO in file for use against the later revision at the request of some engineers. Some of these same engineers have told DLA to use superseded AECOs made to an old revision against a later revision. Neither practice is “wrong” within current guidelines, but they are incompatible.

5. A review of AECOs against contractor drawings shows other misunderstandings. For example, while performing a modification to the B1 fleet without Rockwell’s awareness, an OC-ALC engineer issued AF AECO #96C0007 against a Rockwell drawing which created a new Rockwell dash number “-071”, and superseded “-061”, without Rockwell’s knowledge or approval. The drawing already has two Rockwell AECOs against the drawing, and a new revision of the drawing may be delivered at any time due to errors found during inspection which must be corrected. When the new revision is received, it will cause the local engineer’s modification and configuration management documentation to be superseded and “lost”. However, this is within current AFI 21-402 guidelines for AECOs.

6. Request that AFMC configuration management and engineering data offices review the AECO process for changing contractor drawings and issue guidance. Our recommendation is that MIL-STD-973 guidance be applied, such that:

- a. Only the current design activity (CDA) can issue changes or revisions to a master, original drawing.
- b. Engineering change proposals to drawings must go through an approval process.
- c. Approved proposals must be negotiated or contracted with the CDA contractor for their incorporation
- d. Copies of the changed drawings must be delivered to the government.

7. Point of contact for questions is Marvin Woodworth, OC-ALC/TILDOE, DSN 336-5748.

*< Signed >*

RICHARD A. RODGERS, Chief  
Engineering Data and Tech Order Branch  
Logistics Support Division, TI

Attachments:

1. OC-ALC/LPART Ltr, 28 Feb 96
2. OC-ALC/TIL Ltr, 4 Mar 94
3. White paper, “Ownership of Drawings”, 14 Oct 86



**DEPARTMENT OF THE AIR FORCE**  
HEADQUARTERS OKLAHOMA CITY AIR LOGISTICS CENTER (AFLC)  
TINKER AIR FORCE BASE, OKLAHOMA 73145

MEMORANDUM FOR OC-ALC/TILD

28 Feb 1996

FROM: OC-ALC/LPART  
3001 Staff Drive Ste 2AG110  
Tinker AFB OK 73145-3031

SUBJECT: Air Force Advance Engineering Change Orders (AECOs) Against Contractor Drawings (OC-ALC/TIL ltr, 4 Mar 94)

1. We concur with the concerns and issues identified in the above letter. (Copy attached).
2. Our experience with AECOs against contractor drawings have demonstrated much confusion regarding the following.
  - a. How permanent are the AECOs which are issued against contractor drawings? Current practice at OC-ALC leaves the status of an AECO against an older revision in limbo and leaves the engineer responsible for actions related to the arrival of the new revision. Communications between TILC and the Engineering Branches on drawing updates is minimal. EDCARS procedures on drawing storage/retrieval is cumbersome and unreliable with regard to AECOs and drawing revisions. With increasing DLA activity in the use of engineering data, confusion regarding AECOs can only escalate. This will be especially true if each ALC has a different approach regarding AECOS.
  - b. When the contractor identifies data problems with the AECOs and the part has been transferred to DLA what is the policy for ensuring corrective action or drawing updates is performed?
  - c. Regulation prohibits dual engineering offices for configuration items. If the contractor has configuration management through drawing ownership, the Air Force cannot perform unilateral changes to drawings it does not own. What is regulation/policy that permits this to occur?
  - d. What prevents two ALCs from issuing AECOs against the same drawing? Multiple application drawings, and different NSNs for the items on the drawing allow this to happen.
  - e. What is our policy on AECOS for the upcoming contractor maintained data repositories?
  - f. Can DLA prepare AECOs against contractor drawings?

g. When item management responsibilities are transferred to DLA and AECOs have been prepared against those items, what are the procedures to assure the AECOs are transferred and maintained with the appropriate drawings?

3. Our recommendation is that the current practice regarding preparation and management of AECOs be closely reviewed. Failure to resolve these issues in a timely manner will only escalate the problem for the Air Force.

*<Signed>*

SALVADOR BORREGO, Aerospace Engineer  
F101/TF30/TF41 Engineering Section  
Systems Engineering Branch



**DEPARTMENT OF THE AIR FORCE**  
HEADQUARTERS OKLAHOMA CITY AIR LOGISTICS CENTER (AFLC)  
TINKER AIR FORCE BASE, OKLAHOMA 73145

MEMORANDUM FOR SEE DISTRIBUTION

4 March 1994

FROM: OC-ALC/TIL  
3001 Staff Dr, Ste 2AH98C  
Tinker AFB OK 73145-3062

SUBJECT: Air Force Advance Engineering Change Orders (AF AECOs)  
Against Contractor Drawings - INFORMATION MEMORANDUM

1. The information in Attachment 1 impacts engineers and how Air Force changes are documented on contractor current design activity drawings. Based on the information, engineers should consider abandoning the practice of preparing Air Force Engineering Change Orders against contractor design activity drawings, and ensure that Air Force approved changes are incorporated by contractor current design activity drawings and change documentation.

2. For any questions, contact Mr. Woody Woodworth,  
OC-ALC/TILDOE, DSN 336-5748.

< Signed>

LYNN D. SHACKELFORD  
Chief, Logistics and Support Div.  
Technology and Industrial Support

Attachment  
AF ECOs Against Contractor Drawings

cc:  
HQ AFMC/ENCS  
OO-ALC/PKDD  
SA-ALC/TILA  
SM-ALC/TILA  
WR-ALC/TILC  
OC-ALC/TILDC  
OC-ALC/TILDOS  
OC-ALC/TILDT  
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Air Force Advance Engineering Change Orders to  
Contractor Design Activity Drawings

1. Air Logistics Center engineers have been using Air Force Form 2600 Advance Engineering Orders to "document" internally generated "changes" to contractor design activity drawings for some 30 or more years. This has always been a dubious "work-around" practice, and was used only because the Air Force did not have funding for proper incorporation of large numbers of changes to contractor drawings. DLA transfers and advances in engineering data digital documentation and distribution requires that this practice be reevaluated in view of the demands of wider DOD use, Contractor Logistics Support, direct on-line access to contractor data repositories, Military Engineering Data Access Locator System (MEDALS), EDCARS, JEDMICS, inter-ALC data exchange, interservicing, personnel downsizing, and CALS initiatives. These new challenges bring about adjustments that disallow some former practices, and especially those practices which were "work-around" and local in nature, such as "Advance ECOs" against contractor drawings. Discontinuation of AF Advance Engineering Change Orders (AECOs) against contractor design activity drawings (where the original is still in the possession of a contractor) appears advisable.

2. TILDO is continuing to place Air Force Advance Engineering Change Orders (AECOs) prepared against a contractor drawing into the data repository. However, the new digital era presents problems which impact how these AF AECOs against contractor drawings will be processed, maintained, and used (if at all) in the future. DOD use of MEDALS, DLA transfers of items, conformance to MIL-STD-100, MIL-STD-973, MIL-T-CITIS, PDES, IDS, CLIP, and AFR 57-4 will probably cause the ALCs to readjust its questionable AECO practices to conform to DOD and industry standards.

3. In earlier years, when AF AECOs were in a closed ALC environment, TILDO could assist engineers with AECO maintenance. Now that DLA is using our drawings, and seeking later revisions of drawings from any source, including latest revisions direct from the contractor design activity, TILDO cannot control or assist with AECOs as in earlier years. TILDO can control its drawings only if contractor drawing maintenance is performed in accordance with strict MIL-STD-100 and MIL-T-31000 practices. In other words, any change to a contractor drawing must be performed or incorporated solely by the current design activity of that drawing. The current design activity is the activity that has the master original of the drawing, and that original is the official origin of all copies made from that drawing, including revisions.

4. Any AF AECO against a contractor design activity drawing submitted to the TILDO repository is solely at the submitter's

risk. TILDO and other DOD/Industry activities can be relied upon only to treat all engineering data in accordance with DOD directives and practices, as follows:

a. Each change authorization document (ADCN, AECO, etc) applies to, AND ONLY TO, a specific revision letter. Each newer revision supersedes ALL earlier revisions and ALL outstanding changes (ADCNs, AECOs, etc) against that revision, including ANY AF AECO. A new superseding revision may arrive at any time, from later this week to years later. When that later revision arrives, each unincorporated change against an old revision which is not included on the newer revision of a drawing is, in effect, superseded or "deleted" (lost) unless that change is reestablished by a subsequent change against the newer revision. The old AECO will be archived in EDCARS concurrent with archiving of the superseded revision, or may be left in place concurrently with the later revision but will not have any effect on the later revision, except to introduce confusion. If an AF AECO documents a class 1 or 2 change to a design, that change is "wiped out of existence" by a later revision if not incorporated on the later revision.

b. In no case can any AECO, ADCN, (etc), be made "revision generic" to apply to more than one revision of a drawing. (A 1970s attempt to allow this proved catastrophic.)

c. Many of the contractor drawings affected by Air Force AECOs impact items managed by DLA. DLA may never see the AF AECOs, and may obtain later revisions direct from the contractor or from other ALCs or services which would obsolete an ALC AECO, and obsolete any ALC changed design documented on an ALC AECO. Additionally, DLA may use an AF ECO from another ALC that reverses an OC-ALC AECO.

d. Automation and severe manpower cuts in the repository may preclude future repository notification to AECO preparers of new revision arrivals and, in effect, of removal of changes and designs created on AF AECOs to contractor design activity drawings.

e. No design activity can truly change the drawings whose originals are owned by another design activity, although the ALCs have thus far bent the rules and "pretended" that we have changed original drawings not in our possession.

f. Under present practices, each ALC can issue conflicting AF AECO designs and changes against the same contractor drawing, and each ALC and each contractor design activity can issue an identical ECO number. The repository digitally and on aperture cards can show only the ECO number, and show it as being issued only by the original design activity.

g. There is no local visibility of what DLA is using for engineering data.



h. ALC continuation of creating AF AECOs against contractor drawings establishes a precedent for DLA, military services, and contractors, whereby "AECO Wars" can occur in attempting to override each other's changes.

i. The ALC's repositories have not distributed their local AF ECOS against contractor drawings outside their own repository. No ALC is aware of what AF ECOS have been issued by other ALCs against contractor drawings.

5. The limitations imposed by automation mandate the future use of long established change procedures contained in MIL-STD-973. Contractual arrangements, such as engineering tasks on engineering services contracts, must be utilized to change original master drawings in the possession of the current design activity, as they are the sole means of making that change. While AECOs are currently being mailed to current design activities, they are informational only and not binding on the contractor in any way. AF AECOs to contractor drawings may conform to AFR 81-11, but they and AFR 81-11 do not conform to MIL-STD-100 and MIL-STD-973.

6. In brief, the practice of AF AECOs against contractor drawings appears to be approaching an end, and the ignoring or loss of past and present preparation and design efforts of AF AECOs to contractor drawings seem assured. An engineer's only reliable alternative to using an AF AECO to document a change to a contractor design activity drawing in today's changed environment is to "go by the book", which is:

a. Go to the current design activity contractually per MIL-STD-973 and have him change the drawing per MIL-STD-100, and then obtain a copy for the Air Force data repository and usage. Normally, a drawing delivery will involve a data line item on a new contract, or a task assignment on a sustaining engineering contract. In some cases, the activity may change the drawing voluntarily and provide a free copy with unlimited rights, or,

b. Prepare an Air Force part on an Air Force drawing. However, this has important limitations and requisites which are often overlooked. For an Air Force part to be used on a contractor design activity design, the contractor design activity using drawing must cite the Air Force part number, which means the using contractor drawing must be changed concurrently with the creation of the Air Force drawing and part. An Air Force part established and stocklisted as an item interchangeable with a contractor's part number functions as intended for spares, but not when the next higher assembly is acquired or manufactured, or

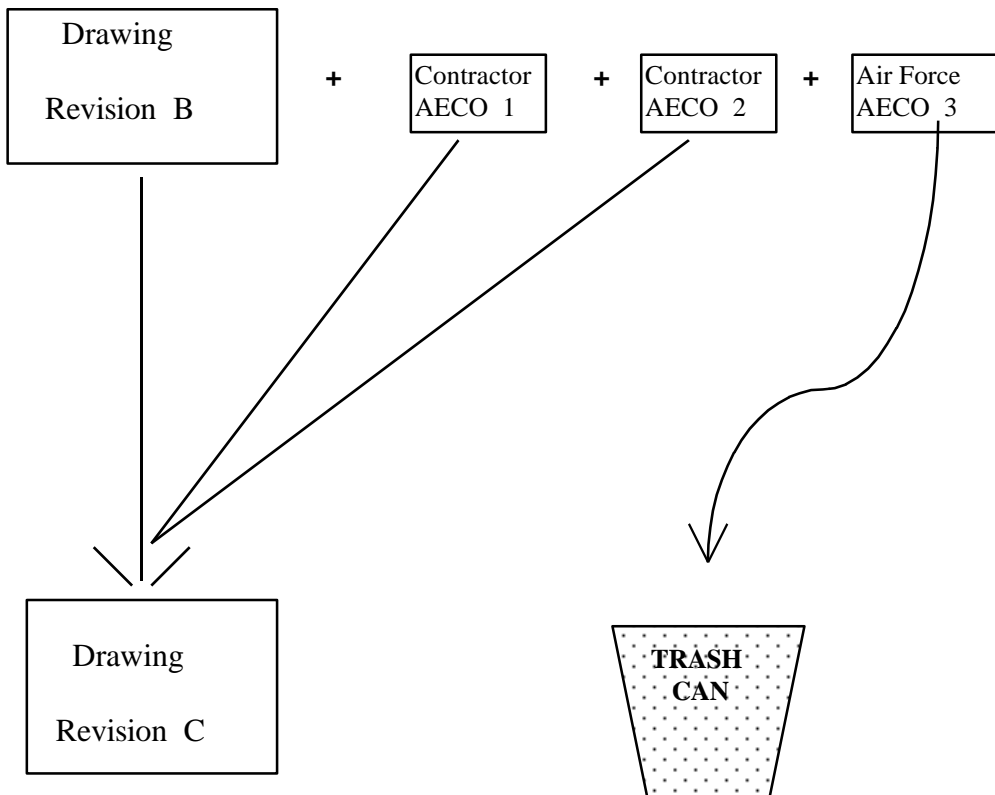
c. Have the end item contractually designed on official Air Force design activity drawings. The originals are shipped to the Air Force before contract termination.

d. Procure the affected contractor drawings(s) outright and have the drawing originals transferred to the Air Force under a formal design activity transfer. Although the drawings and parts will be permanently identified to their original design activity CAGE code and name, the drawing originals will be changed and revised in the same manner as Air Force original drawings.

7. Engineering offices should consider a review of outstanding AF ECOs against contractor drawings to ensure preservation of intended permanent Air Force changes.

## EXAMPLE

**Outstanding ECOs to "B" apply to "B" only**



**All outstanding ECOs and current changes are incorporated when drawing revision letter is advanced. Drawing is always re-released "clean" of all AECOs. ALL OUTSTANDING AECOS TO THE OLD REVISION WHICH ARE NOT INCORPORATED ON THE NEW REVISION ARE SUPERSEDED AND "DIE". ALL PRIOR AECO CHANGES, IF NOT INCLUDED IN THE LATER REVISION, ARE "UNDONE" AND "LOST".**

## TRAINING OWNERSHIP OF DRAWINGS

1. Quite often one in the engineering data field will hear statements such as "We (the Air Force) bought the drawings, so now we're the design activity", or "We bought the drawings, so now we can change them any way we want". Both statements are false in the context normally used. The following explains why.

2. The *current design activity* of a drawing "owns" that drawing. We rarely buy drawings. We normally only buy UNLIMITED RIGHTS to use **COPIES** of drawings whose original (master) remains in the sole custody, possession, and ownership of the *current design activity*. We (the Air Force) own drawings ONLY under the following conditions:

a. Air Force drawings. The Air Force has the original (master) drawings and an Air Force FSCM is on the drawing as the *current design activity*.

b. Contractor drawings. The Air Force is the *current design activity* ONLY when the original (master) drawing of the *original design activity* has been transferred to the Air Force under a *formal design activity transfer*. An Air Force FSCM is added to the ORIGINAL drawing by a formal revision to the drawing, with an advance in the revision letter (unique waivers excepted). The contractor totally relinquishes all duties, ownership, custody, liability, and engineering responsibility as a result of this formal transfer. From the time of transfer, ONLY the assigned Air Force *current design activity* can make direct, physical changes to the drawing. **IF THE TRANSFER CONDITION DESCRIBED HEREIN DOES NOT EXIST FOR A CONTRACTOR DRAWING, THE CONTRACTOR (NOT THE AIR FORCE) OWNS THE DRAWING.**

3. The contract clause that buys unlimited RIGHTS to use technical data (a COPY of a drawing) constitutes recognition that the contractor OWNS the contractor drawing. For example, buying a license to manufacture a patented item does not constitute ownership of a patent.

4. We DO NOT have the right to change "unlimited rights" drawings any way we want. We are under the strict rules of AFR 57-4, AFR 65-3, AFR 81-10, AFR 81-11, AFLCR 57-21, DOD-STD-100, and DOD-STD-480 for changes, and for proposing changes, to ANY drawing -- whether an Air Force or contractor drawing, and whether an original or a mere delivered copy. Even our rules for "changing" contractor drawings, whether or not we have unlimited rights, are very awkward, because a contractor has no obligation whatever to change his own drawing unless the Air Force contracts with him to accomplish the change. Our so-called "Advance ECOs" against contractor drawings are Rube Goldberg in style, because no *current design activity* or engineering office can unilaterally, truly "change" a drawing of another *current design activity*. If the practice was legitimate, there would be endless industry and government ECOs, counter-ECOs, counter-counter-ECOs, etc., against one another's drawings. In fact, we have somewhat of that problem now when equipment responsibility overlaps among Air Logistics Centers, and contradictory ECOs from different ALCs appear against the same contractor drawing. In spite of their administrative awkwardness and questionable legitimacy, Air Force Advance ECOs to contractor drawings are often a necessary evil, because they are convenient for "quick and dirty", locally recognized engineering "changes" of a limited nature. However, one should be aware that they do not in fact change a contractor drawing.